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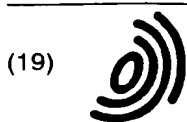
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(54) **Skate with adjustable size**

(57) A skate (1) with adjustable size has a toe unit (2) and a heel unit (9). The heel unit (9) is slidingly associated with the toe unit (2) through sliders and a fastener (19) constituted by a screw (20) is adapted to ad-

just and lock the mutual axial position of the heel unit (9) with respect of the toe unit (2). The fastener means is operated through a folding lever (20) associated with the skate (1).

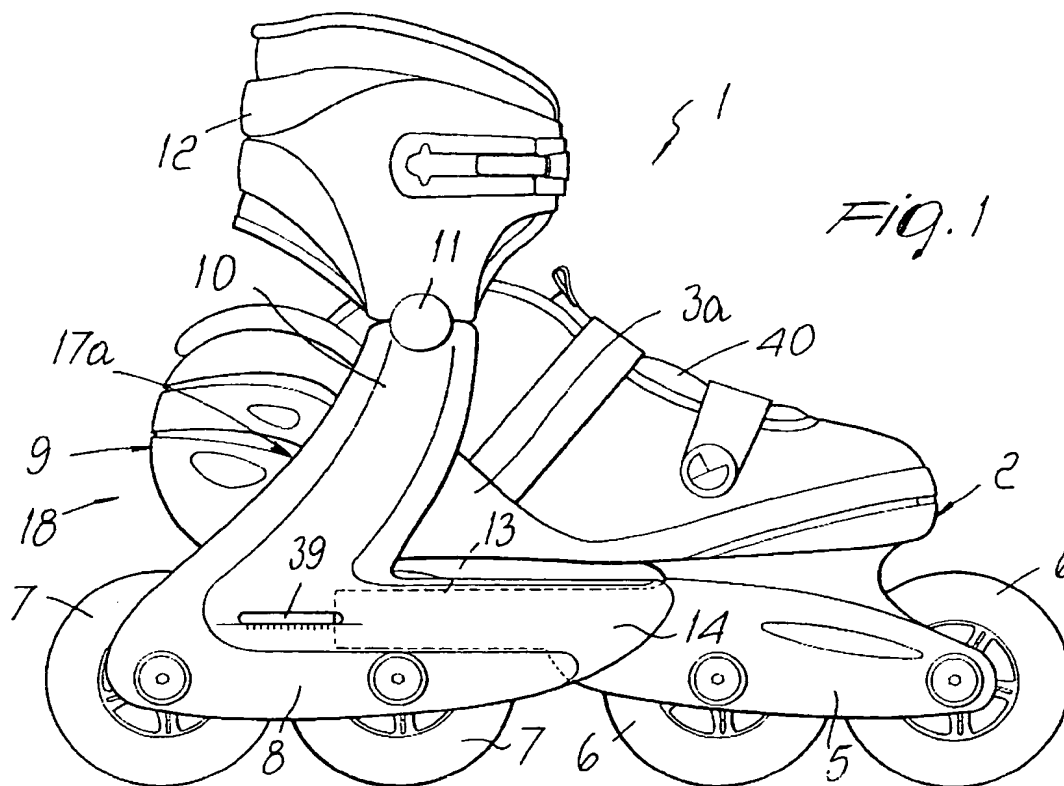


Fig. 1

Description

[0001] The present invention relates to a skate with adjustable size.

[0002] Roller skates provided with a shoe with adjustable size are known and offer unquestionable advantages, especially if used for children, not only from the economic standpoint but also from the point of view of the practicality and convenience of being able to use a product for a much longer period.

[0003] Moreover, a sports shoe with adjustable size can be used by several people, even if they have different foot sizes, thus allowing to hire out skates even to users having different foot sizes.

[0004] US-5,678,833 discloses a skate with in-line wheels whose length is adjustable and which has a rigid supporting frame for a plurality of wheels arranged in-line, a shell which includes a toe unit and a heel unit, and a first means, formed in the heel unit, for coupling to the frame. The heel unit has a sole slidingly connected to the base of the toe unit by means of a second engagement means.

[0005] The second engagement means comprises a screw, for the removable coupling of the base of the toe unit to a part of the frame, thus allowing the toe unit to slide with respect to the heel unit in a direction which is substantially parallel to the longitudinal axis of the skate. A cuff is connected to the heel unit by means of a pair of studs. The studs are connected to a sliding means provided on the two side walls of the toe unit.

[0006] Such prior art skate has a rather complex structure which increases the manufacturing costs. Moreover, adjusting the size of the skate is not a straightforward operation. The adjustment in fact requires some time, because it is necessary to first loosen the screw by means of a tool and then put the skate on to find the exact position of the heel unit with respect to the toe unit. Then, it is necessary to tighten the screw again, with the possibility of unwanted changes in the position of the various members.

[0007] A further drawback of such prior art adjustable skate is the lack of any visual indication of the size or length used: this entails that a user who has already performed a size adjustment cannot rapidly restore the exact original position but has to perform the same complicated procedures performed the first time.

[0008] IT-1,257,603 discloses a skate with in-line wheels comprising a monolithic shell and wheel support.

[0009] The shell is open upward and to the rear; a quarter is selectively and slidingly associated with the shell at the rear and a tongue is associated with the shell in an upward region.

[0010] The quarter has a rear grip handle for the user and has a brake which can be associated by snap action with a frame which is in turn associated with the support.

[0011] By acting on a pair of screws it is possible to vary the size of the skate by changing the axial position of the quarter with respect to the shell.

[0012] This type of adjustable-size sports shoe, however, has the main drawback that the adjustment of the skate size is obtained by moving the rear part of the shoe therefore shifting the position of the heel, and consequently there is an undesirable and disadvantageous variation of the position of the center of gravity with respect to the wheels.

[0013] That is an important drawback because almost all the weight of the body is transmitted to the ground through the resting region that corresponds to the heel, and a displacement of the heel can lead to adaptation difficulties in skating.

[0014] A further drawback of the above-described prior art skate is its complicated structure required to achieve both lateral support and mutual sliding of the various members.

[0015] A further drawback of the above-described prior art skate is that the size may be varied only by discrete amounts which approximately correspond to one foot size each and therefore the user may be unable to precisely adapt the skate to the size of his or her foot, having to do with an approximate adjustment by choosing the next larger size with respect to his or her exact size.

[0016] Other conventional skates with adjustable size have the drawback that the adjustment devices are arranged along the sides of the skate, in positions which often interfere with sports practice by partially protruding from the structure of the frame.

[0017] The aim of the present invention is to overcome the above-described problems, eliminating the drawbacks of the cited prior art, by providing a skate with adjustable size, particularly an in-line roller-skate or an ice skate, whose size can be adjusted simply and straightforwardly while allowing optimum sports practice.

[0018] An important object of the invention is to provide a skate which provides for a substantially continuous adjustment of the size, so that the user can adapt the shoe to the exact dimensions of his or her foot and so as to also achieve optimum balance.

[0019] Another object is to provide a skate which provides for an immediate visualization of the size selected by the user.

[0020] Another object is to provide a skate which does not have protruding members which may limit its functionality during sports practice.

[0021] Another important object is to provide a skate which can be easily adjusted by the user without requiring additional tools or instruments.

[0022] Another object is to provide a skate which is simple and intuitive to use.

[0023] A further object of the invention is to provide a skate with adjustable size which is not substantially aesthetically different from conventional non adjustable skates.

[0024] A further object is to provide a structurally simple skate which can be produced at low manufacturing costs.

[0025] The above aim and objects, as well as other objects that will become better apparent hereinafter, are achieved by a skate with adjustable size as claimed in the appended claims.

[0026] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a particular embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

FIG. 1 is a side view of the skate according to the invention, shown in the assembled condition;

FIG. 2 is a side view of the skate according to the invention, shown before being assembled;

FIG. 3 is a sectional front enlarged view of the sliding means;

FIG. 4 is an exploded perspective partial view of the connection and adjustment means which can be inserted in the heel unit and in the toe unit;

FIG. 5 is a perspective view of the connection and adjustment means inserted in the heel unit and in the toe unit;

FIG. 6 is a perspective view, similar to the preceding one, of the heel unit and of part of the toe unit, without the connection and adjustment means;

FIG. 7 is a top view of an innerboot, or upper, usable in the skate according to the invention, provided with a transparent region.

[0027] With reference to the above-cited figures, the numeral 1 designates an in line roller skate.

[0028] The skate 1 comprises a toe unit, designated by the reference numeral 2, having two wings 3a and 3b, laterally and to the rear. Wings 3a and 3b are preferably slightly curved and protrude upward with respect to a first base member 4.

[0029] The toe unit 2 is associated with a first support 5 having a transverse cross-section in the shape of an inverted U in order to support a first pair of in-line wheels, designated by the reference numeral 6.

[0030] A second pair of in-line wheels, designated by the reference numeral 7, are supported by a second support 8 which is associated with a heel unit 9.

[0031] The second support 8 has two wings 10 which are approximately L-shaped and protrude upward. Pivots 11 are associated with the ends of the wings for pivoting a cuff 12.

[0032] A sliding means is provided at the facing ends of the first and second supports 5 and 8 for the mutual longitudinal sliding of the toe unit 2 and the heel unit 9. The sliding means comprises a first pair of side portions 13 and a second pair of side portions 14 which respectively protrude to the rear from the first support 5 and in front of the second support 8, in an approximately horizontal direction.

[0033] The toe unit 2 can slide with respect to the heel unit 9 because the first pair of side portions 13 are slidingly engaged in shaped first seats 15 provided, inter-

nally and axially, in the side portions 14.

[0034] The heel unit 9 comprises a second base member 16, which is in contact with the second support 8, and two side walls 17a and 17b which protrude upward and are curved and blended, to the rear, with a rear wall 18 which is also curved.

[0035] The second base member 16 has a fastener means 19 for connecting and adjusting the mutual axial position of the toe unit 2 and the heel unit 9. Wings 3a and 3b, of the toe unit 2, slide on the internal lateral surface of the pair of side walls 17a and 17b of the heel unit 9, and the base 4 rests and slides on the base 16.

[0036] The fastener means 19 comprises a mechanical connecting member, such as for example a screw, designated by the reference numeral 20, which is arranged so that its axis is parallel to the longitudinal axis of the skate and has, at one end, a head 21 which is shaped like a parallelepiped.

[0037] The head 21 protrudes to the rear from the heel unit, at an abutment surface 50, which is formed on the outer surface of the rear wall 18 and is perforated for the passage of a stem 22, which protrudes toward the toe unit 2.

[0038] The stem 22 is constituted by a first smooth part 23, which is adjacent to the head 21, and by a second threaded part 24, which is arranged opposite the head 21. A recess 25 is formed between the first smooth part 23 and the second threaded part 24.

[0039] The head 21 has a first transverse through hole 26 and is arranged between a third pair of tabs 27a and 27b, which are mutually parallel and are provided at a first end 28 of a folding lever 29, so that the first through hole 26 lies along the same axis as a pair of second through holes 30a and 30b, which are formed respectively in the third pair of tabs 27a and 27b.

[0040] In this manner, the screw 20 can be associated with the folding lever 29, by means of a pivot 31 which can slide with an interference fit within the first and second through holes 26, 30a and 30b.

[0041] The folding lever 29 can thus rotate about the pivot 31 and is curved so that it can be accommodated in a complementarily shaped second seat 32 which is formed in the rear wall 18 of the heel unit 9.

[0042] When the folding lever 29 is lowered so that its second end 33 is free and protrudes to the rear of the heel unit 9, it allows the user to turn the screw 20 about its own axis.

[0043] This produces the sliding, along the second threaded part 24 of the stem 22, of a complementarily threaded nut 34 which is retained within a complementarily shaped seat 35 which is formed at one end of the toe unit 2.

[0044] This activates the translatory motion of the toe unit 2 with respect to the heel unit 9, since the screw 20 is locked, with respect to an axial movement, by the interference of the side walls of the recess 25 with the facing surfaces of a protrusion 36 which protrudes upward from the second base member 16 and has a com-

plementarily shaped third seat 37 for accommodating the recess 25.

[0045] The sliding of the toe unit 2 with respect to the heel unit 9 is also facilitated by the presence of first and second guide members 38a and 38b which are formed respectively in the first base member 4 and in the second base member 16.

[0046] A graduated viewing port 39 is provided laterally to the second support, at one or both of the second side portions 14. The viewing port 39 is constituted by a slot or by a transparent member included in the second tab.

[0047] The viewing port 39 is arranged so as to allow to view the free end of the respective first side portion 13, so as to allow the user both to easily read the size that is set and to straightforwardly perform adjustment according to the intended size.

[0048] The skate 1 comprises an innerboot, or an upper, designated by the reference numeral 40, which is associated with the toe unit 2 and has at least one transparent or open region 42, at a toe region 41. The transparent or open region 42 allows viewing of the toes, thus allowing the user, particularly a child, to easily and intuitively adjust the size of the shoe.

[0049] The operation of the skate is as follows: with particular reference to FIG. 5, the user can vary the length of the skate 1 simply by lowering the folding lever 29 and acting thereon so as to turn the screw 20.

[0050] Since the nut 34 is prevented from turning in either direction because it is arranged in the seat 35, the rotation of the screw 20 entails the advancement or retraction of the toe unit 2 with respect to the heel unit 9, depending on the direction of the rotation of the screw.

[0051] The screw is in fact prevented from moving axially in both directions by virtue of the interference between the lateral walls of the recess 25 and the walls of the protrusion 36.

[0052] The translatory motion of the toe unit 2 with respect to the heel unit 9 is guided by the two wings 3a and 3b, which can slide along the internal surfaces of the two side walls 17a and 17b, by the first and second guiding members 38a and 38b, which can slide with respect to each other, and by the interaction of the first and second pairs of side portions 13 and 14.

[0053] Once the intended adjustment has been reached, the folding lever can be returned into the second seat 32 and the selected size can be read at the viewing ports 39.

[0054] It has been observed that the invention has achieved the intended aim and objects, a skate having been provided whose size can be adjusted simply and straightforwardly.

[0055] The skate according to the invention is also perfectly suitable for a normal sports practice and its performance is similar to conventional non adjustable skates.

[0056] The skate according to the invention is susceptible of numerous modifications and variations, within

the scope of the appended claims.

[0057] The materials used, as well as the dimensions that constitute the individual components of the invention, may be more pertinent according to specific requirements.

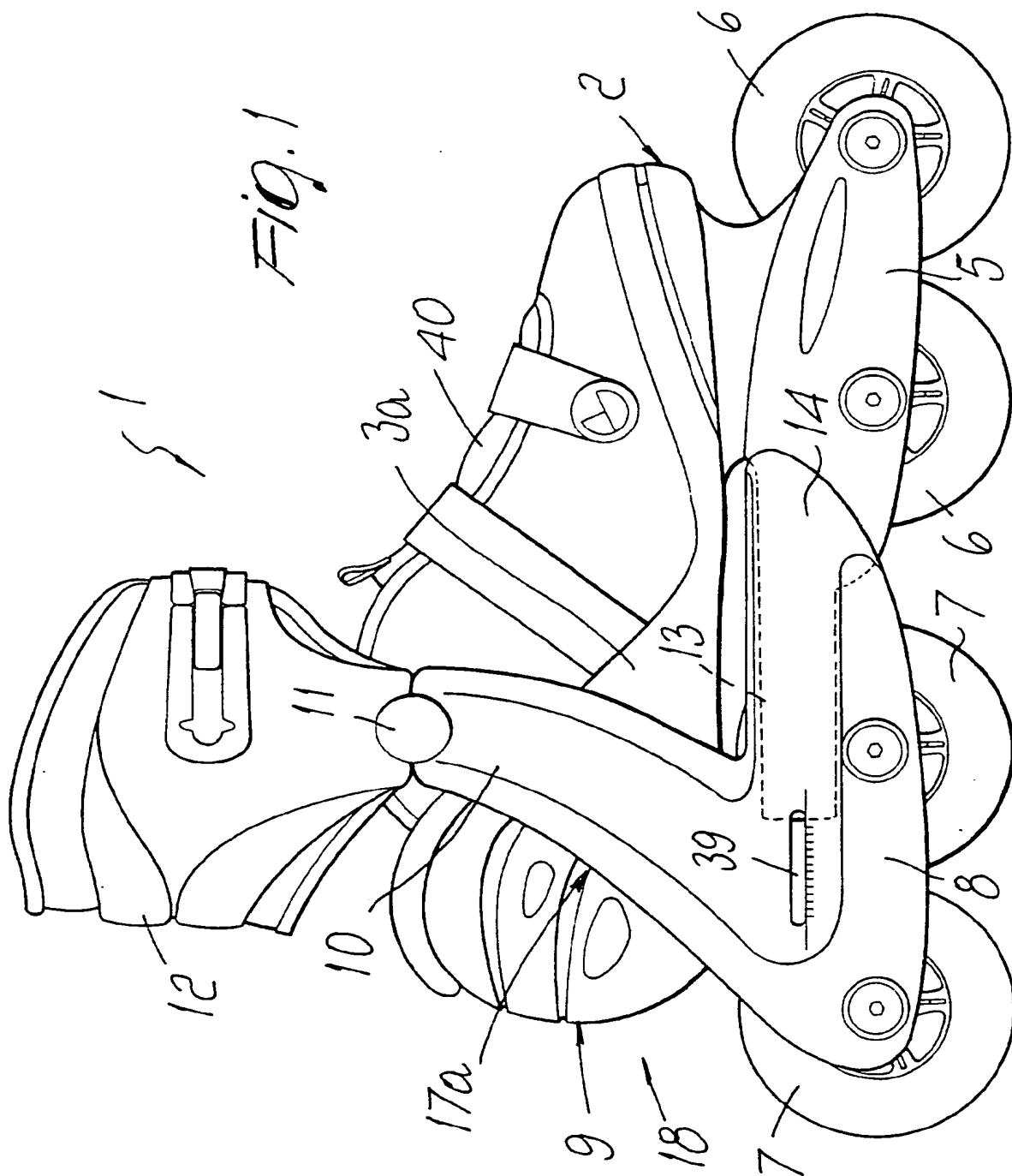
Claims

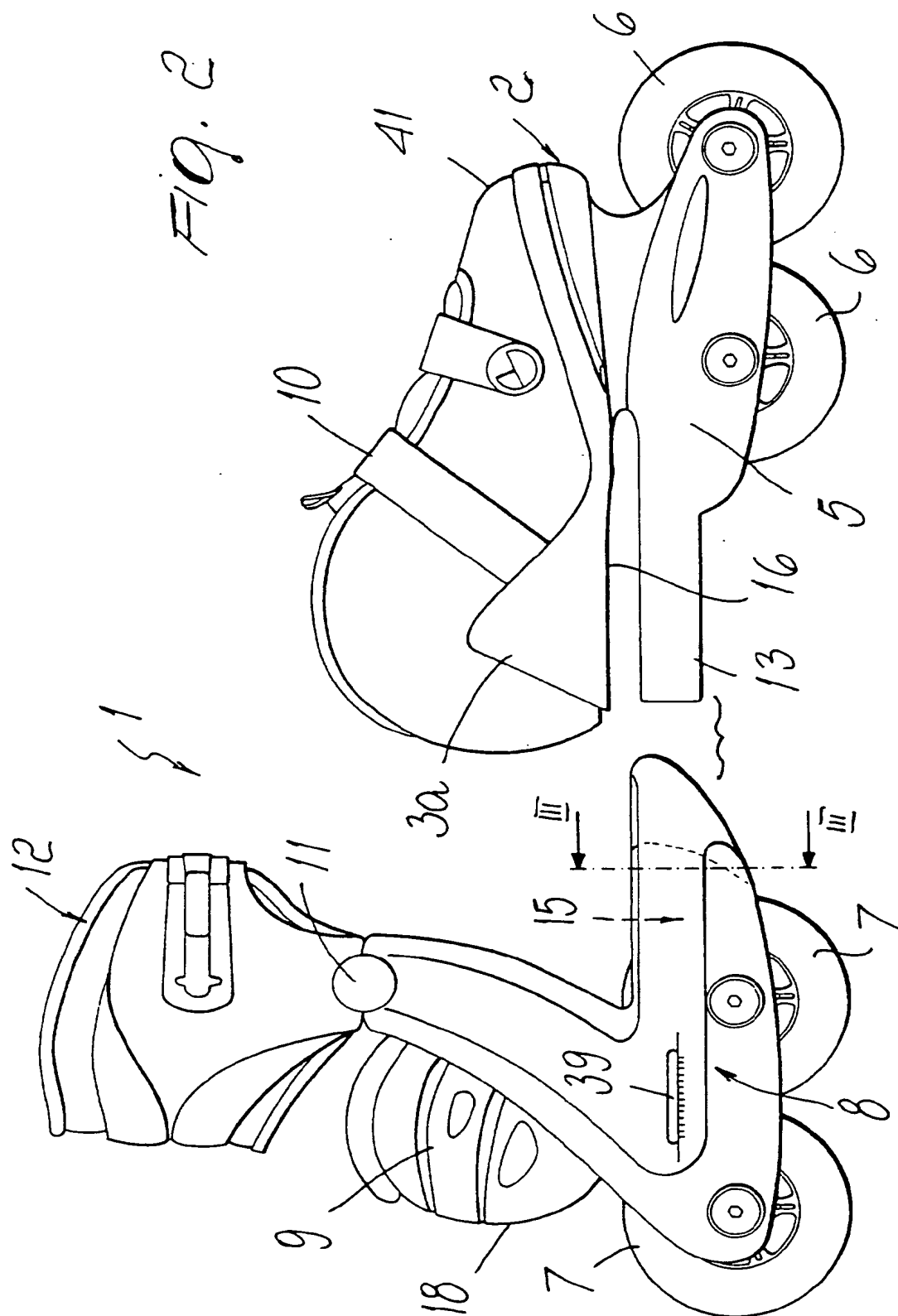
1. A skate with adjustable size, **characterized in that** it comprises a toe unit and a heel unit, said heel unit being slidably associated with said toe unit through slider means, a fastener means being adapted to adjust and lock the mutual axial position of said heel unit with respect of said toe unit; said fastener means being operated by means of a lever associated with said skate.
2. The skate according to claim 1, **characterized in that** said toe unit has two wings, to the side and to the rear, said wings being slightly curved and protruding upward with respect to a first base member, which rests slidably on a second base member formed in said heel unit.
3. The skate according to claim 2, **characterized in that** said heel unit comprises said second base member, from which two side walls protrude upward, said walls being curved and blended to the rear with a rear wall which is also curved, said pair of wings of said toe unit resting and sliding on the internal lateral surface of said pair of side walls.
4. The skate according to claim 3, **characterized in that** said second support is laterally provided with two wings which are approximately L-shaped and protrude upward, respective pivoting studs for a cuff being associated with their ends.
5. The skate according to claim 3, **characterized in that** said slider means comprises a first pair of side portions and a second pair of side portions that respectively protrude to the rear from said first support and in front of said second support, in an approximately horizontal direction.
6. The skate according to claim 5, **characterized in that** said second side portions have, internally and axially, respective complementarily shaped first seats for positioning, so as to allow axial sliding, said first pair of tabs, and therefore said toe unit, with respect to said heel unit.
7. The skate according to claim 6, **characterized in that** said fastener means for connecting and adjusting the mutual axial position of said toe unit and heel unit comprises a screw, which is arranged so that its axis is parallel to the longitudinal axis of said

skate and interacts with a complementarily threaded nut and has, at one end, a head which is shaped like a parallelepiped.

8. The skate according to claim 7, **characterized in that** said head protrudes to the rear from said heel unit, at an abutment surface formed on the outer surface of said heel unit, and is perforated for the passage of the stem of said screw, which protrudes toward said toe unit. 5
9. The skate according to claim 8, **characterized in that** said stem comprises a first smooth part, which is adjacent to said head, and a second threaded part, which lies opposite said head, an annular recess being formed between said parts. 10
10. The skate according to claim 9, **characterized in that** said head is provided with a transverse first through hole and can be arranged between a third pair of mutually parallel tabs which are provided with a folding lever at a first end. 15
11. The skate according to claim 10, **characterized in that** said first through hole is arranged along the same axis as a pair of second through holes which are formed in said third pair of tabs. 20
12. The skate according to claim 11, **characterized in that** said screw is associated with said folding lever, by means of a pivot which can slide with an interference fit within said first and second through holes. 25
13. The skate according to claim 10, **characterized in that** said folding lever, which can rotate about said pivot, is curved in order to be retractably arranged in a complementarily shaped second seat formed in said rear wall of said heel unit. 30
14. The skate according to claim 13, **characterized in that** said folding lever, when lowered so that its second free end protrudes to the rear of said heel unit, allows the user to turn said screw about its own axis. 35
15. The skate according to claim 14, **characterized in that** said nut is retained within a complementarily shaped seat which is formed at one end of said toe unit so as to prevent its translatory motion and rotation with respect to said toe unit. 40
16. The skate according to claim 15, **characterized in that** said screw is locked, with respect to an axial movement, by the interference of the side walls of said recess with the facing surfaces of a protrusion which protrudes upward from said second base member and has a complementarily shaped third seat for accommodating said recess. 45

17. The skate according to claim 16, **characterized in that** a rotation of said screw forces the translatory motion of said toe unit with respect to said heel unit, said translatory motion being facilitated by first and second guide members which are formed respectively in said first and second base members. 50
18. The skate according to claim 17, **characterized in that** it comprises a viewing port provided laterally to said second support, at one or both of the second side portions, said viewing port comprising a slot or a transparent member which is embedded in said second side portion. 55
19. The skate according to claim 18, **characterized in that** said viewing port is arranged so as to allow to view the free end of the respective first side portion, so that the user can easily read the set size and straightforwardly adjust said skate to the intended size. 60
20. The skate according to one or more of the preceding claims, **characterized in that** it comprises an inner-boot or an upper associated with at least said toe unit and having at least one transparent or open region which allows to view said toes. 65





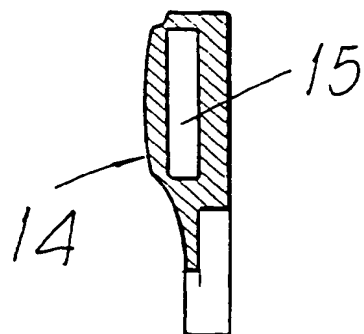


Fig. 3

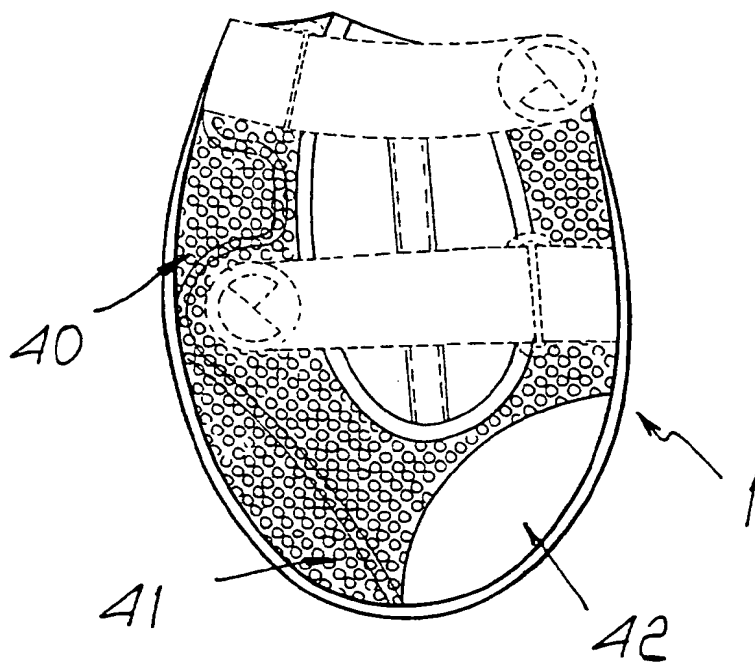
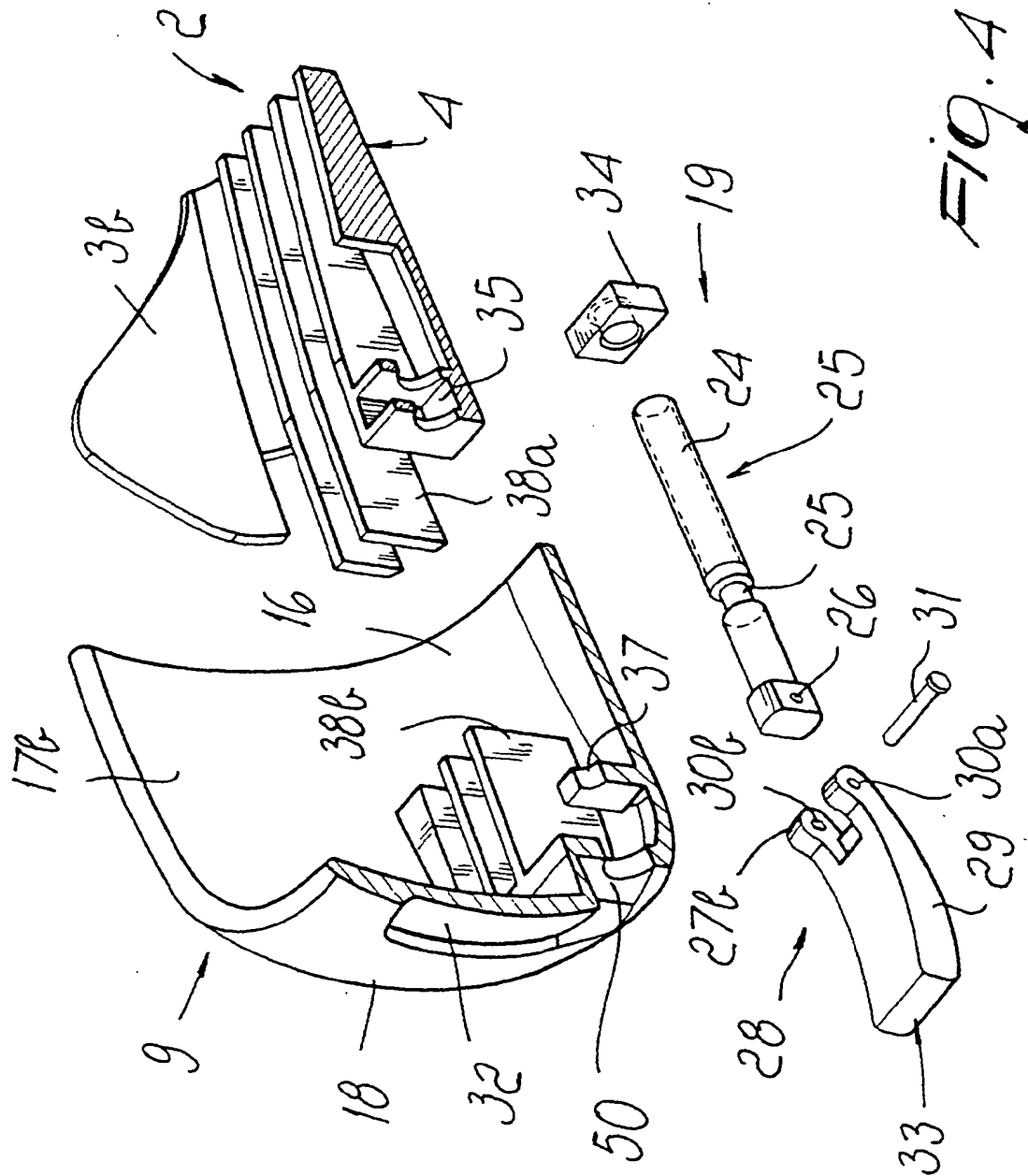
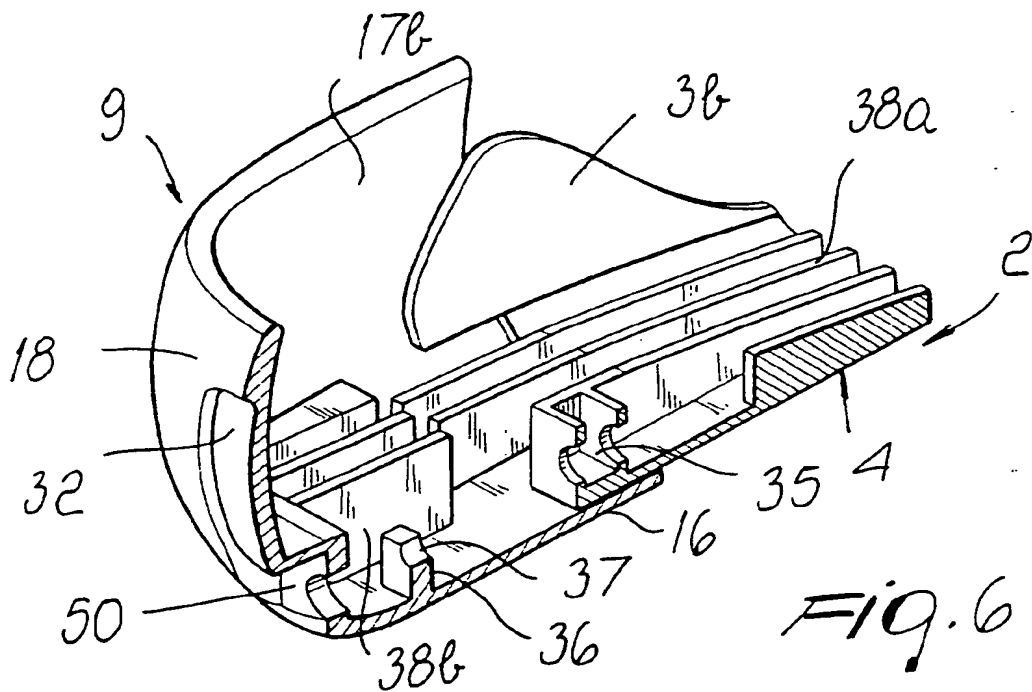
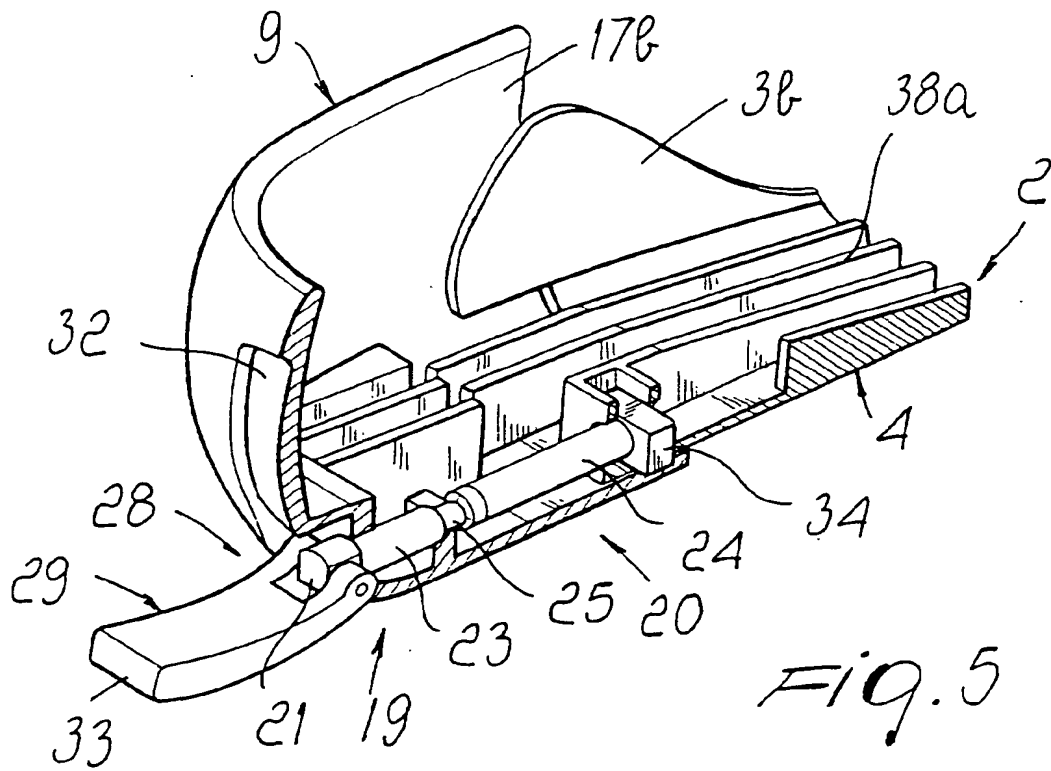


Fig. 7







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 6217

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Y	* the whole document *	2, 3, 5-8, 20	A43B5/16
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 June 2001	Examiner Claudel, B
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